

INTERNET APPLIANCES:  
NEW HORIZONS FOR THE WEB

This panel provides an overview of emerging Web technologies that are fueling the broad range of internet appliances that are starting to appear. While some of these devices are capable of presenting rich media technologies, many are not even capable of presenting full HTML. Enhanced graphics, sound, and animation may not be feasible on many of these devices. Yet many have much more capabilities than even today's personal computers. Will this drive a "lowest common denominator" approach to these devices, or will other factors influence their capabilities? Will Web-based advertising continue to wane? Will other financial models be needed to fuel content for these devices? Will bandwidth be the driving technology?

*Mickey W. Mantle*

A member of the University of Utah gang, Mickey W. Mantle was a contributor to many early computer graphics products from Evans & Sutherland and Pixar, including Pixar's RenderMan software. He has a degree in computer science from the University of Utah and has been attending SIGGRAPH conferences regularly since 1978. He last chaired a SIGGRAPH Panel in 2000.

After joining Broderbund Software in 1991 as vice president of engineering/chief technical officer, he managed technology initiatives and contributed to development of many successful and award-winning products including Living Books, Myst, Riven, and many more. In 1999, he joined Gracenote (formerly CDDb, Inc.) as vice president of development, where he oversees all development of Gracenote Internet services. This includes software for enabling CD audio player applications such as MusicMatch Jukebox, RealJukeBox, WinAmp, Apple's iTunes, and many others.

*Seamus Blackley*

Connected Internet appliances will make their way into the living room in a big way with the next generation of video game machines. These appliances are multi-purpose devices that play CDs, DVDs, and, of course, video games. Plus they are inherently connected to the Internet, because they are designed for broadband connectivity from the outset. These devices will spawn a new generation of applications for the living room that utilize extremely rich media and expect connectivity and high-bandwidth capabilities. They will also be fun to interact with!

Seamus Blackley oversees advanced technology development for Microsoft's Xbox, a consumer-oriented video game machine capable of advanced 3D graphics, CD and DVD playback, and Internet connectivity. The Xbox is scheduled for launch in the United States in September 2001. Prior to Microsoft, he was the project lead on a major game title at DreamWorks SKG, and before that he applied his PhD in physics at Looking Glass Software, where he developed the highly lauded flight physics for its Flight Unlimited game.

*Moderator*

MICKEY W. MANTLE  
Vice President of Development  
Gracenote (formerly CDDb)  
2141 4th Street  
Berkeley, California 94710 USA  
+1.510.849.2332  
+1.510.849.2366 fax  
mmantle@gracenote.com

*Panelists*

SEAMUS BLACKLEY  
Microsoft Corporation

KENT LIBBEY  
Excite@Home

ANDREW LUAN  
Metricom, Inc.

GREGORY D. ABOWD  
Georgia Institute of Technology

*Kent Libbey*

Among these new devices will be "broadband TV" systems that display directly to television (as the only monitor in most living rooms and other communal spaces in the home – kitchens, bedrooms, etc.) and are connected to broadband networks, either directly or indirectly (for example, through a home area network). User interface design and development for such devices involves a different set of constraints and opportunities than designing content and applications for a PC. Lower resolution, navigation with a remote control (rather than a mouse and keyboard), group viewing, and several other factors need to be considered in this design.

Kent Libbey is responsible for development of advanced TV products for Excite@Home, extending the company's broadband content, applications, services, infrastructure, and operations to the TV and other home entertainment outlets. He oversees a staff of 50 people, including product managers, engineers, and user-interface developers. His work in interactive television began in 1993 as director of product management for Bell Atlantic Video Services, where he established and led a staff of marketing and operations professionals, building and running the world's first all-digital video-on-demand television service trial delivered over DSL. Later, as vice president of operations at Tele-TV, a joint venture of Bell Atlantic, Pacific Telesis, and NYNEX, he was in charge of project management, product strategy, operations, and information management for a 150-channel broadcast digital television service.

After leaving Tele-TV, he established the Broadband Services Group, a Los Angeles-based management consulting firm, which provided strategic and business development advice to communications and media companies seeking to leverage emerging broadband technologies. He has also held positions at MCI Communications and McKinsey & Co. He holds a BA from Harvard College and an MBA from the Stanford University Graduate School of Business.

*Andrew Luan*

The Internet has changed the world, bringing instant access to the incredible amount of information available online whenever you are at your computer. Numerous connected devices are beginning to let you access the Web from an untethered device. The Geode Web Pad brings the full capabilities of a Web browser to a device that is convenient to carry and use wherever you are within its vast service areas. How will internet appliances change the way people interact with the Web, and what new products and services will spring up to cater to those who can utilize information "on the run?" Will medium bandwidth be sufficient or will rich media drive higher connectivity requirements?

As director of business development at Metricom, Andrew Luan identifies and works with strategic partners to create new services and opportunities. Previously, he served in product marketing and market development positions for companies in the e-business and interactive TV/data broadcasting/DTV industries, helping them launch new products and enter new industries. He spent four years as an analyst for the wireless telecommunication industry for RB Webber & Company. His studies included market entry strategies for Sprint, Airtouch, and PCSPrimeco. He received his BSEE from the Massachusetts Institute of Technology.

#### *Gregory D. Abowd*

There are many tantalizing possibilities associated with the growing adoption of small, networked devices. Indeed, Mark Weiser's decade-old vision of ubiquitous computing is slowly being realized from the device perspective. But his vision for "putting computing back in its place," out of the foreground of our consciousness and into the background of our peripheral awareness, is not necessarily being served by the proliferation of many different devices. I believe there will be no such thing as a "killer app" for ubiquitous computing that will encourage critical mass adoption of a single device for a single purpose.

I am a firm advocate of the pursuit of the "killer existence," in which an effective marriage of device capabilities and human-centered services helps to put computing in its place as a useful aid to our everyday lives. The research conducted by the Future Computing Environments (FCE) Group at Georgia Institute of Technology is aiming to overcome the research challenges to ubiquitous computing applications development. My personal interests lie in general problems of automated capture and access, context-aware computing, and natural-interaction techniques that scale the diverse set of emerging devices. This work requires an effective partnership between the purveyors of new device technologies and the developers of new ubiquitous-computing applications.

Gregory D. Abowd is an associate professor in the College of Computing and GVU Center at Georgia Institute of Technology. His research interests include software engineering for interactive systems, with particular focus on mobile and ubiquitous computing applications. He leads a research group in the College of Computing called the Future Computing Environments Group, which focuses on development of prototype future computing environments that emphasize mobile and ubiquitous computing technology for everyday uses. He received the degrees of MSc and DPhil in Computation from the University of Oxford, which he attended as a Rhodes Scholar. Before moving to Georgia Tech in 1994, he held post-doctoral positions with the Human-Computer Interaction group at the University of York and the Software Engineering Institute and Computer Science Department at Carnegie Mellon University.

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